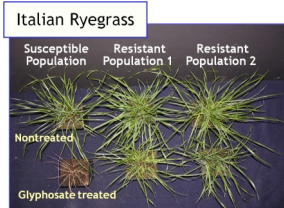
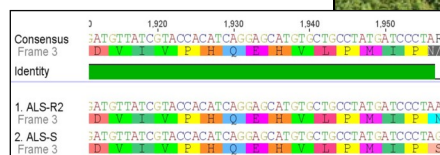
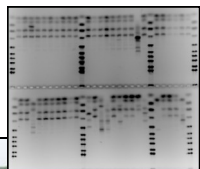


## Characterization and Mitigation of Herbicide-resistant and Recalcitrant Weeds

- Establish the level of resistance and pattern of cross-resistance/multiple resistance of various weeds to herbicides, and herbicide interactions that promote control of these weeds; and establish structural, biochemical, and genetic characteristics that limit herbicide efficacy against recalcitrant weeds, such as nutsedges.



- Evaluate the contribution of dispersal mechanisms to the spread and distribution of resistance; and discover potential resistance mechanisms using structural, biochemical and genetic probes.



Additional information is available at:  
[www.ars.usda.gov/sea/cpsru](http://www.ars.usda.gov/sea/cpsru)



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## Crop Production Systems Research Unit



**USDA**  
Agricultural Research Service  
Stoneville, MS

## The Crop Production Systems Research Unit has a comprehensive interdisciplinary research program dedicated to solving problems associated with crop management in the Mid-Southern United States.

### Mission

- ◆ Develop sustainable management strategies for corn, cotton, and soybean production in the mid-southern United States and to determine the impact of crop management practices on yield and quality.
- ◆ Develop water management technologies, including novel sensing methods to determine crop water status and improve irrigation scheduling.
- ◆ Improve pesticide application technologies for spray drift management, maximize in-field pesticide deposition, provide targeted application, and develop remote sensing methods to detect the onset of crop stress.
- ◆ Characterize herbicide resistance mechanisms and manage resistant weeds.
- ◆ Address soil resource management through effective conservation practices and herbicide dissipation.



### Development of Sustainable Integrated Crop Management Systems

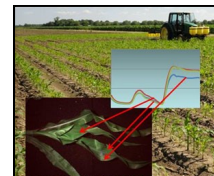
- Develop sustainable management strategies for cotton, corn, soybeans and other crops grown in the mid-southern United States, and determine the impact of crop rotations, tillage, and herbicide regimes on crop physiology and weed control options.



- Evaluate the impact of crop management on quality traits of various crops in the system, including cotton (gossypol, boll development, fiber maturity, length, strength and uniformity) and soybean (fatty acid profiles and protein quality).

### Development of Pesticide Application Technologies for Spray-Drift Management, Maximizing in-Field Deposition, Targeted Spraying, and Remote Sensing

- Control off-target drift and enhance penetration of active ingredients, such as fungicides and biological control agents, into crop canopies.
- Develop remote sensing methods, utilize and evaluate Global Positioning Systems (GPS), develop methods amenable to rapid image processing, and evaluate flow control systems to support variable rate aerial application.



### Development of Water Management Technologies

- Develop novel sensing technologies to determine crop water status and improve irrigation scheduling.
- Quantify the potential for and conditions under which site-specific irrigation and nutrient applications can address spatially varying field conditions and crop requirements.



### Maintaining Soil Resources for Effective Conservation and Herbicide Management

- Assess the effects of weed management and conservation practices on soil biological, chemical, and physical properties under Mississippi Delta conditions.
- Develop strategies to both improve herbicide efficacy and reduce the environmental impact of herbicide use.

